

- VI. "Researches on the Structure, Organisation, and Classification of the Fossil Reptilia. Part IX. Section 2. On the Reputed Mammals from the Karroo Formation of Cape Colony." By H. G. SEELEY, F.R.S. Received January 4, 1894.

(Abstract.)

The author re-examines the remains of *Theriodesmus*, and contests the interpretation of the carpus given by Professor Bardeleben, producing specimens of South African Reptiles in which there is a single bone beneath the radius, as in *Theriodesmus*. This character is shown in a small skeleton, at present undescribed, which the author obtained from Klipfontein, Fraserberg, which he regards as referable to a new genus. Other evidence is produced supporting the interpretation of three bones in the proximal row in the carpus, in a specimen from Lady Frere. The author then compares the forelimb of *Theriodesmus* with that of *Pareiasaurus*, which was obtained subsequently, and arrives at the conclusion that the types of limb are too closely related to be referred to different orders of animals, and therefore that *Theriodesmus* must be transferred from the Mammalia to the Therosuchia.

The skull described as *Tritylodon longævus* is examined, and its close resemblance to the skulls of new Theriodonts is pointed out. The author believes that it shows evidence of possessing both pre-frontal and post-frontal bones, which were situate as in Theriodonts, and circumscribed the orbits in the same way; so that, although the post-frontal bones appear to have met in the median line to form a crest, at the back of the frontal, there is no other character in the skull by which it can be distinguished from the skull of a Theriodont. It therefore appears to be reptilian, and thus would make known divided roots to the molar teeth in Reptilia, and a more complicated type of crown than in any Theriodont yet known.

- VII. "Researches on the Structure, Organisation, and Classification of the Fossil Reptilia. Part IX. Section 3. On *Diademodon*." By H. G. SEELEY, F.R.S. Received January 12, 1894.

(Abstract.)

The author describes fragments of jaws and teeth from Upper Karroo strata at Wonderboom and Aliwal North, collected by R. D. Kannemeyer and Alfred Brown. They may possibly belong to more

than one genus ; but, in absence of sufficient knowledge of the skull to establish differences, the four species are referred to a new genus, *Diademodon*. Its hinder molar teeth have undivided roots, and low crowns, which are subquadrate or transversely ovate, surrounded by a diadem of low cusps, which are chiefly developed on the external and internal borders, with crenulations or minute cusps on the anterior and posterior margins of these teeth. There is a low central cusp in the middle of the crown from which slight ridges extend, chiefly in the transverse direction ; but in the type species these ridges take the form of a cross. The species are distinguished by the form of the crown and the details of the cusps. The upper and lower teeth are opposed so as to be evenly worn, but the mandibular teeth are narrower.

These teeth are highly specialised, but distinct in plan from *Tritylodon*, and from all known Reptiles. They closely approximate to some of the higher Mammalia. The author refers *Diademodon* to a division of the Theriodontia in which the teeth become worn with use, which is named Gomphodontia.

VIII. "On the Effect of Magnetisation upon the Dimensions of Wires and Rings of Annealed Iron." By SHELFORD BIDWELL, M.A., LL.B., F.R.S. Received February 14, 1894.

In the year 1885 I submitted to the Royal Society the first of a series of papers\* upon the changes produced by magnetisation in the dimensions of rods, &c., of iron and other magnetic metals. The chief, and perhaps the most interesting, subject of the paper was the observation that if the magnetising force were sufficiently increased, the extension which a magnetised iron rod at first underwent (as originally noticed by Joule†) was followed by contraction, the rod ultimately becoming shorter than when it was unmagnetised. The elongation was generally found to attain a maximum with a magnetising force of from 80 to 120 C.G.S. units, and to vanish with a force of 300 to 400, retraction occurring when still higher forces were applied.

From that date until quite recently no accounts of similar experiments by other workers have, so far as I know, been published. About the beginning of last year, however, it was stated in the scientific journals that M. Alphonse Berget had investigated the magnetic dilatation of iron in strong fields, and had found that the length of his bar was still increasing when the magnetic field had

\* 'Roy. Soc. Proc.,' vol. 40 (1886), pp. 109, 257 ; vol. 43 (1888), p. 407 ; vol. 47 (1890), p. 469 ; vol. 51 (1892), p. 495. 'Phil. Trans.,' vol. 179, A (1888), p. 205.

† Joule's 'Scientific Papers,' pp. 48 and 235.